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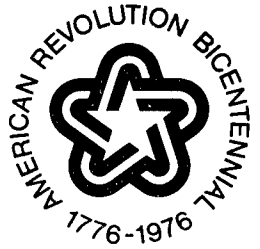

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CONTENTS PAGE

ACHIEVEMENTS OF THE MEDICAL AND PHARMACEUTICAL INDUSTRIES

Sofia ZDRAVEN FRONT in Bulgarian 4 Sep 76 p 2

[Report: "New Bulgarian Medical Apparatus and Medicines"]

[Text] Man and the other living organisms live within a natural earth magnetic field. However, its intensity is rather low and could rise during so-called "magnetic storms." With the development of technology, conditions are created for the creation of a considerably stronger magnetic field in some enterprises, laboratories, and so on. For this reason, this factor and its influence on living organisms has been subjected to various studies.

The human organism contains a tremendous number of ions and polyions most of which are in constant movement at slow speed. We know that the magnetic fields affect all moving particles which change their trajectories and engage in circular motion. The influence of the magnetic field will be the greater the higher its induction. In this aspect it could be expected that a high intensity magnetic field will influence the overall body reactions. The extensive action of this field could trigger considerable conditions affecting the movement of ions and polyions. In this manner the different processes within the living organism could be suppressed or entirely stopped. A dosed magnetic field could result in a positive movement of ions and, therefore, in a normalizing of regulatory mechanisms in the human organism.

On the basis of such theoretical postulates, Docent Dr Nencho Todorov developed a pulse-magnetic field apparatus with a broad frequency range of repetition, pulse duration, and five types of steplike capacities determining its manifest pain-relieving and, above all, counterinflammation action. Such apparatus have been designed in Romania and the Soviet Union as well. However, their magnetic fields are not of a pulsating nature, since the current creating them is not of a pulsating nature itself.

The Bulgarian apparatus suggested by Docent Dr N. Todorov and built by ISEMA [expansion unknown] and the Ministry of Public Health, headed by Sr Scientific Associate Engineer Iv. Daskalov, has been accepted as a rationalization (No II-208/1974).

The apparatus' technical parameters are the following:

Current supply: alternating current with a 50 Hertz frequency and a 220 volt tension;

Gradual regulation of the initial magnetic field;

Built-in stimulator for the generation of an interrupted alternating magnetic field with a steplike regulation of pulse and interval lengths (pulse duration ranging from 0.1 to 1 seconds and interval duration also ranging from 0.1 to 1 seconds; the pulse repetition frequency ranges from 0 to 100 Hertz -- the physiologically most active frequency).

Use of a pulse magnetic field offers certain substantial advantages. In the intervals during which the field is acting, ions and polyions could slightly deviate from their path, while during the pause their movement takes place through diffusion, osmosis, and active transportation. For this reason, the interrupted magnetic field, applied through impulses, exercises a certain correcting action on the various reaction links without weakening or interrupting the course of vital processes.

Clinical observations conducted thus far have proved that the pulse magnetic field apparatus has a strong pain-calming, anti-inflammation, and trophic action.

In the case of acute and chronic inflammation processes, if no results are achieved by the use of classical physiotherapy, the variable magnetic field with a pulse system improves trophism, energizes the specific immune organism defense (increased function of the middle suprarhenal-cortex zone) and influences the process of the disease favorably.

The magnetic field has indicated very good results in the treatment of mastites, acute subcutaneous inflammation processes, radiculites, rheumatoid arthritis, arthroso-arthrites, prostatites, periarthrites, and [epididimites]. It also energizes the nonspecific and specific immunal protection of the body.

The original method suggested by Docent Dr N. Todorov for treatment with a pulse magnetic field and his apparatus represent a valuable contribution to contemporary physiotherapy, enriching our medical equipment and upgrading treatment effectiveness in various socially significant nosologies.

The apparatus is already being applied in medical practice and its serial production has been undertaken. Some other countries as well have been interested in it. By Senior Scientific Associate Dr St. Busarov, Scientific Institute for Resort Science, Physiotherapy, and Rehabilitation.

Kratemon

As a result of extensive scientific research, the flavonoid preparation Kratemon was developed in our country. It contains a purified flavonoid mixture of the leaves of Crataegus monoginus, Thus far, 19 flavonoids have been isolated from it, including hyperosid, quercetin, vitexin, crataesid, rutin, rutinoids, and others. The advantage of Kratemon compared with the remaining Crataegus preparations is that it can be standardized. It is stable and has high biological activeness. Thus the initial studies indicated that the preparation enhances coronary debit both "in vitro" experiments in an isolated rabbit heart as per Langendorf, and "in vivo" experiments with the catheterization of coronary sinus in cats. Subsequently it was established that along with intensifying the coronary current, Kratemon reduces oxygen consumption in the myocardium. At the same time, a tendency has been noted of slowing down cardial activities, increased amplitude of cardial contractions, and an insignificant drop in blood pressure. The study of the coronary action of the preparation indicates that in the flowmetric measurement of the debit in a dog, the coronary blood circulation rises by about 50 percent. Here again we note an insignificant slowdown of the cardial rhythm and a weak and short drop in the blood pressure.

Kratemon has an interesting effect on haemodynamics. In addition to the insignificant bradicardial action, we note the increased minute volume of the heart and the cardial index. Furthermore, under the conditions of an artificially triggered low blood pressure (hemoragic shock), Kratemon raises both the aortal and the arterial pressure. Under the same conditions, the activity of the left ventricle improves particularly tangibly. The cardiotonic effect of the preparation could be related to the established influence on the respiratory chain. This influence on tissue respiration is doubled and depends on the concentration: small concentrations intensify, while big concentrations suppress the respiration of cardial and hepatic mitochondria.

Kratemon affects brain irrigation to a lesser extent than cardial irrigation. Nevertheless, the effect is sufficiently strong and must be taken into consideration in formulating the indications for use of the preparation.

It has been proved that Kratemon is effective particularly in coronary damages. It has a prophylactic as well as healing effect in pituitrin coronary spasm. A proper influence was also felt on isoprenaline infarct

in white rats. It has a positive effect on occlusion infarct in white rats. It is interesting to note that in the latter model of coronary damage, we note a tangible necrotic center while the zone of the infarct becomes richer in vascular anastomoses. Such a development of the vascular network is obtained also in the case of a healthy heart following lengthy treatment. The result has been confirmed also by the communication submitted by (Kapeli) and associates.

These experimental data prove the interesting and rich pharmacodynamics of Kratemon. The proven basic properties determine the directions for its use. It is indicated in the case of all forms of chronic disturbances of coronary circulation. Its moderate cardiotonic action could also be used. This makes it particularly suitable in the case of so-called "old heart" in which the positive effect is intensified by the capillary-strengthening effect of Kratemon. Another valuable quality of this preparation is its tolerability which gives clinicists substantial dosing freedom, an advantage possessed by few cardiovascular preparations. By Dr M. Taskov, candidate of medical sciences, NIKHFI [Scientific Research Chemical-Pharmaceutical Institute], Sofia.

Tempalgin

Bulgarian researchers have used a variety of methods to study the influence of Tempidon, the Bulgarian tranquilizer, on the strength and duration of the analgetic action of analgin. Pharmacological studies conducted on experimental animals established that the combination of analgin and Tempidon, 100 milligrams per kilogram each, intensifies the strength and, particularly, the extent of pain relief. Results have indicated that even in the fourth hour after the application, the effect is stronger than the maximal analgin effect at the 30th minute of its introduction. Only in the sixth hour does it drop by 50 percent of its highest strength. This has led to the conclusion that in small and medium doses (50 - 100 milligrams per kilogram), Tempidon more than doubles the analgetic action of analgin, while in chemical pain irritation the combination is effective 3 times longer than the corresponding dose of pure analgin. In turn, the analgin gives power to the tranquilizing effect of the Tempidon. In terms of toxicity, the interaction between the two preparations is additive.

This led to the creation of the new Bulgarian analgesic Tempalgin. One Tempalgin tablet contains 500 milligrams of analgin and 20 milligrams of Tempidon, while one ampule contains 1 gram of analgin and 20 milligrams of Tempidon per 2 cubic centimeters. Clinical studies of Tempalgin were conducted by noted Bulgarian surgeons, neurologists, and stomatologists. Their tests indicated that in cases of pain caused by pressure in healthy individuals, a combination of 500 milligrams of analgin with 20 milligrams of Tempidon intensifies the analgetic

effect of pure analgin 500 percent and extends it nearly 100 percent. It was also established that while the separate use of 1 gram of pure analgin has an overall influence of the pain syndrome in diseases of the peripheral nervous system, in 69 percent of the cases Tempalgin tablets eliminate and in 95 percent of the cases reduce pain in such diseases. In tooth drilling, the electroexcitability of the tubercula declines by 20 percent in the 15 minutes following the swallowing of a Tempalgin tablet, by 60 percent on the 30th minute, and by 80 percent in the 60th minute. The absorption of a single analgin tablet did not trigger changes in the electroexcitability. On the basis of a large number of observations in surgical cases, it is recommended for the combination with a lower dose of analgin to be used in cases of first (lightest) degree of pain intensity, while a higher dose should be used in the second and third degrees.

Tempalgin tablets could be taken once - twice and as often as four - five times daily, 1 tablet or, if necessary, 2 tablets at a time. Injections are administered intramuscularly from 1 to 3 times daily. This preparation is used for treatment of headaches, toothaches, biliary and rhenal colics, neuralgias, neurites, radiculites, acute and chronic rheumatism of the joints, influenza, post-operative pains, and others. Hypotonic conditions, allergies, agranulocytoses, and thrombocytopenia are counterindications for its use. It is already available in pharmacies in tablets and ampules will be available shortly.

5003
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NEW MEDICINES AND INSTRUMENTS EXHIBITED AT PLOVDIV FAIR

Sofia ZDRAVEN FRONT in Bulgarian 12 Sep 76 p 1

[Report by Dr Iv. Genev, ZDRAVEN FRONT correspondent: "New Medicines and Instruments at Plovdiv Fair"]

[Text] An exhibition of the Bulgarian pharmaceutical industry represented by the Farmakhim DSO [State Economic Trust] in Sofia is located in Pavilion No 18 of the Ministry of Chemistry. Over 200 medical drugs produced by the Plant for Antibiotics in Razgrad and the chemical-pharmaceutical plants in Sofia, St. Dimitrov, and Troyan are displayed. Displayed for the first time are the preparations gentamycin Kolir (eyedrops), Rondomycin and Vibramycin in capsules, produced on the basis of the Pfeiser Company license. These are modified tetracyclins with improved effect, resorption, and tolerance. Also exhibited is a new injection form of the well known original Bulgarian tranquilizer Tempidon, thus far produced in tablets. The new form will be for fast use and a more effective influence on patients in a psychomotor excitability condition. Another new drug is Perigran, an anti-cough syrup based on biologically active substances isolated from the bark of the pomegranate tree. It is used for the treatment of acute and chronic tracheites, bronchites, bronchial asthma, pulmonary emphysema, silicosis, and others, affecting adults and children. Along with providing an expectorant and calming cough reflex, the preparation has anti-allergy properties as well. Another new preparation is 1 Lonetil (tablets). This is a synthetic tranquilizer developed by the chemical-pharmaceutical institute in Sofia. Stomatologists have welcomed with interest the Bulgarian preparation fluorid (tablets) needed in the treatment of dental caries. It is packaged in jars and in 100 and 1000 tablets. Also displayed for the first time is the original chemical-therapeutic preparation Biklotimol used in the treatment of infections caused by gram-positive microorganisms. It comes in two forms: an ointment for treatment of purulent skin infections,

and tablets to be sucked for colds and other diseases affecting the mucous membrane of the mouth. A new preparation for treatment of enlarged veins in surgical practice is offered under the name of Venoruton, developed on the basis of a license purchased from the Swiss (Zima) company. It is offered in capsules and ointment forms. It will be produced as an injection as well. Other new medicinal preparations are displayed such as Bariskop, Algozin, Adepren, Visken, and others.

The impressive "Elektro-76" Pavilion presents a display of complete dental offices. The apparatus Yunit, whose extremity develops 500,000 rpm, and the amalgam mixer are of interest. This not only eliminates the harmful contact of the personnel with the amalgam but also saves valuable time. A new suction attachment has been installed on the Yunit which sucks out and takes saliva and particles from the mouth of the patient. It could be used for three Yunit apparatus simultaneously.

Also exhibited are three types of quartz lamps: small and portable, for home use, with a 125 watt power, combined quartz and ultraviolet lamps, and bigger lamps of 250 and 400 watts. Also interesting is the Selektor electrocardiograph used in mass prophylactic studies of cardial activities. It could be handled by secondary medical personnel, for it marks, on the basis of eight indicators, automatically, any pathological deviation by lighting a bulb. Also exhibited are the new automatic x-ray apparatus RD-700, a "Chronoreflexometer" -- an apparatus used to determine reaction time in the human body in vocational guidance offices, a "galvanostat" -- an apparatus for use in physical therapy wards, "Gastroema" -- a stomach-intestinal stimulator for recovery after more severe operations, and others.

5003
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ACCELERATED STUDIES IN THE USE OF NUCLEAR ENERGY

Sofia RABOTNICHESKO DELO in Bulgarian 21 Sep 76 p 3

[Article by Academician Khristo Khristov, director, Bulgarian Academy of Sciences Institute of Nuclear Research and Nuclear Power Industry and Senior Scientific Associate Vasil Khristov, head of the Problem Group for Neutron Data and Nuclear Power Industry: "Accelerated Nuclear Power Industry Research"]

[Text] The Basic Directions in the Socioeconomic Development of Bulgaria in the Seventh Five-Year Plan, adopted at the 11th BCP Congress, pays deserved attention to the development and proper utilization of power resources, and particularly, the nuclear power industry. In 1980 the production of electric power must reach about 38 billion kilowatt hours, while the share of the electric power produced by nuclear power plants must be about 20 percent. The main purpose of the scientific research done in the field of physical and physical-technical sciences is to direct nuclear, neutron, and reactor physics to the effective development, application, and utilization of nuclear power sources and the search for and utilization of new sources of energy.

The collective of the Bulgarian Academy of Sciences Institute of Nuclear Research and Nuclear Power Industry feels a responsibility for the implementation of this important party task and is dedicating maximal efforts for its implementation. In the Sixth Five-Year Plan, the institute worked on ten contract power industry problems totaling about 400,000 leva. The following were created: an instrument for automatic measurement of the concentration of boric acid in the heat container of the reactors of the Nuclear Electric Power Plant in Kozloduy, awarded the silver badge "For High Technical Level"; an experimental reactor circulation cycle for the study of water - water type reactor systems; an instrument for the absolute measurement of nuclear reactor power; and reactor programs for determining reactor neutron-physical characteristics.

Currently, in the spirit of the July BCP Central Committee plenum, the main task is to improve further the institute's research programs with a view to upgrading the level and effectiveness of scientific activity. The research program for neutron and reactor physical studies is important. The Committee for Science, Technical Progress and Higher Education, and the Committee for the Peaceful Utilization of Atomic Energy entrusted the collective with and are supervising the implementation of yet another two additional coordination programs related to the obligations of our country along the CEMA line.

These programs cover physical problems of the nuclear power industry: interaction between neutrons and nuclear fuels and structural materials; transportation of neutrons in reactor environments and materials; making experimental computations and estimates of neutron data needed for designing and operating nuclear power reactors.

Research on the fuller study of VVR-1000 type reactors will be continued with a view to their utilization in nuclear electric power plants. Particular attention is being paid to the physics of fast neutron reactors which will be the basis of the nuclear power industry after 1985.

Our internal integration is developing to an ever greater extent, particularly our ties with the Ministry of Power Industry and its scientific-production organization. We are working in the closest possible cooperation with specialists from the Nuclear Electric Power Plant in Kozloduy. Experimental methods and apparatus and a set of computation programs are being developed to determine the extent of combustion of the nuclear fuel and the accumulation of secondary nuclear fuel, as well as the determination of the thermophysical parameters and dynamic processes taking place in nuclear electric power plants. New methods and apparatus are being developed related to the control, diagnosis and management of reactors. We are continuing the development and utilization of new methods for the deactivation of radioactively polluted surfaces and for the concentration and storage of radioactive waste. The institute is training cadres for our nuclear power industry through systematic qualification courses. It is participating in the training of students in engineering physics at the Physics Faculty of Sofia University.

With a view to joining efforts, in May 1975 the Institute of Nuclear Research and Nuclear Power Industry sponsored a seminar on the trends and prospects of development of the power industry in which our best specialists participated. Preparations are under way for a second such seminar on physical and physical-technical problems of the power industry, to be held in October 1977.

Close cooperation with Soviet nuclear institutes, which is continuously intensifying and expanding, is an exceptionally important factor in the successful implementation of the program and in reaching a high

level of scientific research activities. Our institute is successfully cooperating with the Physics Institute of the USSR Academy of Sciences and the I.V. Kurchatov Institute for Atomic Energy in Moscow, and the Physics-Energetics Institute in Obninsk, which are leading in the field of Soviet nuclear power industry. Our participation in the work of the Joint Institute for Nuclear Research in Dubna, which celebrated its 20th anniversary this very year, has been durable and exceptionally fruitful. With the help of the Soviet Union, an international scientific collective was set up for reactor-physics research with an experimental base in Budapest. Our participation in the activities of this collective insures the high level of our scientific research in this field.

Along with research in the field of nuclear power industry, the Unified Center for Physics and Physical-Technical Problems has elaborated a broader program for the development of new sources of energy and new methods for its transportation and utilization to be reviewed and approved by the Bulgarian Academy of Sciences management. It includes research and development of new nuclear power sources as well as plasma physics, direct utilization of solar power, and use of superconductivity in high tension electrical engineering. These problems are being developed at the Institute of Electronics, the Institute of Solid State Physics, and the physics faculty of Sofia University, and are being followed by a coordination commission for new power sources set up by the Unified Center.

On the basis of the slogan of "High Quality and Effectiveness!" the personnel in the physical sciences will direct ever greater efforts to the accelerated development of research in the field of nuclear power industry and new power sources. In the spirit of the July BCP Central Committee plenum, forces will be focused further on the main tasks. The organizational structure of the institute, established on the basis of the problems principle -- temporary problems groups rallied in big sectors and sections numbering 50 to 60 people -- was successful.

However, a number of difficulties and shortcomings must be surmounted. Many internal reserves remain for the more effective utilization of the material and technical base, for the even better compacting of time and upgrading the effectiveness of scientific research. Following the example of the Joint Institute for Nuclear Research in Dubna, we must bring together expensive electronic and computer equipment, analyzers, small calculating machines, semiconductor nuclear radiation detectors, and others within a single measurement center which will engage in the fast utilization of contemporary measurement and computing methods with automated labor intensive nuclear physics experiments.

The requirements facing the heads of scientific units will become ever stricter. Their scientific activities, organizational work and

individual labor discipline determine, above all, the load of the collectives and the rhythmical implementation of the plan. Particular requirements face the program councils, which develop as a new type of organs called upon to coordinate and manage the implementation of research programs.

Power sources -- conventional and new -- develop as the practical implementation of major scientific discoveries in physics. The production, conversion, transportation, and conservation of energy, as the noted Soviet scientist Academician P.L. Kapitsa has said, are fundamental processes in the study of which physics plays a leading role. Naturally this is a complex problem whose solution involves the participation of a number of natural and technical sciences. Our first nuclear power plant, along with the second, now under construction, come from the Soviet Union. However, this does not exhaust the problem. Many other problems remain, related to adaptation to local conditions, optimal exploitation and improvements of this equipment. More work will be necessary and will be done on such problems.

However, this does not cover all tasks. We cannot fail to watch trends of future development -- breeder reactors, thermonuclear synthesis, and new sources of consumer power industry that could be used even in the next few years. We are maintaining a creative potential on basic physics - experimental and theoretical research, representing an inexhaustible source for new knowledge and all practical utilization.

These are complex problems, and working on them requires a large number of cadres and a high general technical standard. However, they are accessible to us, for we are not alone. We are working together with the fraternal socialist countries, and above all with the leading science of the Soviet Union. Today we need work capacity, profound thinking and enthusiasm which may be found in our cadres, particularly the young ones.

5003
CSO: 2202

FUTURE DEVELOPMENT OF ELECTRONICS INDUSTRY OUTLINED

Sofia IKONOMICHESKI ZHIVOT in Bulgarian 25 Aug 76 pp 1, 15

[Article by Senior Scientific Associate Engineer Angel Angelov, deputy minister of electronics and electrical engineering: "A New Approach to the Development of Subsectors"]

[Text] The 11th BCP Congress noted properly the growing significance of electronics and electrical engineering as the strategic direction in the development of our economy. The ratified Basic Directions of the 11th BCP Congress for the Socioeconomic Development of the Bulgarian People's Republic in the Seventh Five-Year Plan (1976-1980) earmarked the following main tasks facing the sector:

Maintaining high and faster development rates. In 1980 industrial output will be over 2.2 times higher than in 1975;

Developing electronic and electrical engineering output as a profitable export sector;

Increasing its significance in the overall process of reconstruction, modernization, and technical retooling of the national economy, and accelerated electronization of the country's economic and social life;

Upgrading effectiveness;

Maintaining electronic and electrical engineering installations on a high technical and quality level.

Purposeful Scientific and Development Activities

Such activities are of decisive significance to the long-term development of electronic and electrical engineering output. The purposeful policy pursued in this area includes the following basic tasks: to optimize

the ratio between applied research and development and long-term research; proper concentration of scientific and engineering and technical personnel resources and funds along individual directions and problems; creation of an effective structure of scientific and development units within the system.

Work is being done along 30 major scientific directions to insure the further dynamic and effective development of electronics and electrical engineering, the most important of which insure the development of calculating machines, communications equipment, automation equipment and facilities, high tension equipment microelectronics, household appliance electronics, and others. Research and development along such directions not only determine the development of our basic plans but also insure high scientific research effectiveness. Thus, minicomputer systems insure the development of the Elektronika plant; remote control apparatus and systems insure the development of the Plant for Computer Equipment in Sofia and the plant for memory systems in Veliko Turnovo; the manufacturing of compactors and radio relay systems insure the development of the Kl. Voroshilov plant, and so on. The new technical trends will continue to develop at a faster pace: computer and communications equipment, high tension equipment, and automation and microelectronic equipment and facilities.

Our computer equipment has developed through the joint efforts of CEMA member countries, the Soviet Union above all. In the Sixth Five-Year Plan, a production considered large for our scale of ES-1020 computer equipment and of a number of peripheral systems was organized with full structural, program, design, and technological compatibility and specialization. The development trends in this area call for converting to the production of a new generation computer systems with increased action, expanded memory, and new design and technological solutions. This will enable us considerably to reduce the dimensions and weight of the machines and to improve their functional and operational indicators. New design and technological methods will be used to resolve problems of the development of external memory systems, thus modernizing them entirely.

Our communications industry will be able to offer comprehensive transmission and radio relay systems. The modifications of automated telephone exchanges of a quasielectronic type and of radio relay and compactor systems will be expanded. New frequencies will be developed. Pulse-code modulation will be used, and technical and operational indicators will be upgraded.

Further improvements will be made of instruments and facilities for automation encompassed within the national unified industrial automation system. Standardized electronic control systems will be developed

with possibilities for computer use. Series of systems for digital-program control will be extended. Conditions will be created for group control of metal processing machines.

The development of high tension technology will enable us to manufacture complete power systems with considerably upgraded technical and operational indicators.

The main direction in the development of microelectronics will be the further development of integrated equipment based on MOS [International Standardization Organization] technology. It will be characterized by a higher level of integration and expanded use in computer and communication equipment, instrument making, and a number of other areas. A characteristic feature of the Seventh Five-Year Plan is the use of microprocessors in a wide range of electronic and electrical engineering systems.

New technical solutions will be applied to the development of management equipment, household electronics, medical and lighting equipment, and the production of electric motors, low tension equipment, cables and conduits, elevators, household and domestic electrical appliances, and so on.

The influence of scientific and technical progress in electronic and electrical engineering output will be manifested in the annual introduction of 400 - 450 new or improved goods. This will enable us to maintain a high production renovation coefficient (about 20 percent).

Accelerated Electronization

Under the conditions of the accelerated building of a developed socialist society, increased electronic and electrical engineering output and the use of new goods with new functional possibilities create favorable grounds for considerably broadening their use in the national economy and promoting its accelerated electronization. The electronization of the overall economic and social life will be implemented, above all, in the following sectors and production facilities: extracting industry, ferrous and nonferrous metallurgy, machinebuilding, chemical industry, power industry, and agriculture. It will be used extensively in transportation, communications, construction, trade services, banking, scientific experimentation, and medical and administrative services. It will contribute its share to improving the way of life and raising the standard of the people.

The profound study of electronic and electrical engineering output proved that unification and standardization of basic elements, parts and assemblies, as well as of finished products, represents a major reserve

for upgrading production effectiveness as well as a secure means for upgrading production quality. The systematic application of the multiplication approach enables us to develop a streamlined catalog system of standardized elements, parts and assemblies applied in the entire sector and to organize their specialized output. This means the production of printed circuits, mechanical structures, transformers, signal armatures, switching elements, couplers, and others. At the same time, the second standardization level covers the development of type-series of completed functional instruments and equipment based on a limited number of standardized assemblies. For example, it would be possible to develop a type-series consisting of several hundred electronic analog control instruments with various functional purposes within 30 standardized blocks. Currently such development is taking place for other groups of instruments and equipment.

Typification and standardization offer favorable possibilities for the optimal concentration and specialization of the sector's production capacities and, on this basis, the use of their rational deployment.

Sectorial Development

The organization and management of a complex system such as electronics and electrical engineering have a decisive impact on its effectiveness. The measures taken in this respect are directed toward the gradual conversion to a two-step management structure and the related strengthening of the functions of the automated control system. The expansion of subsystems and of resolved problems will considerably upgrade the information and information-control possibilities for sectorial management.

The reduction of material outlays and the related savings of basic material and manpower resources is the durable strategy to be followed in upgrading the effectiveness of electronic and electrical engineering output in which such outlays account for about 62 percent of production costs. The efforts related to the optimal solution of this problem are directed both to the material processing stage and the designing and development of the new commodities.

A determining factor in the first stage is the level of the technology and the skill of the industrial-production personnel operating within the production process. The study of the system of electronic and electrical engineering output has indicated that the efforts of development units and technical departments of plans in the field of modernization and reconstruction must be directed toward the typification of basic technological processes in the sector and their coordination with modern requirements. This applies to processes involving considerable personnel and using large quantities of materials and offering possibilities for the lowering of waste and related losses of material resources. Some

of the more significant of the some 15 technological processes earmarked are the following: coiling technology, stamping technology, technology of galvanic, lacquer, and enamel lining, printed circuit technology, and technology of precise dimensional molding.

The greatest possibilities for the rational utilization of material resources, however, is sought in the process of designing and building equipment, apparatus and machines. This is a difficult problem, since sizes must be reduced and lightened, and local and abundant raw and other materials must be used maximally while retaining and upgrading the technical, quality, and operational indicators of the new commodities. That is why one of the main elements in the policy of managing the electronic and electrical engineering industry is for a considerable share of the assignments based on the plan for science and technical progress to be related to the reduction of the size and weight and amount of used materials in designs, as well as the maintaining of a high production renovation coefficient.

Our electronic and electrical engineering output developed on the basis of close cooperation and interaction with the USSR and the other socialist countries. The complex program adopted at the 15th CEMA Session opened new ways for the acceleration and expansion of economic and scientific and technical cooperation. In the Seventh Five-Year Plan, integration relations with the Soviet Union and the other CEMA member countries will be expanded and intensified in the following promising areas: computer technology, electric motors, switchboard, radio relay, and compaction equipment, electronic systems for agricultural machinery, step regulators, electrical instruments, and others.

The dynamic and effective development of the electronic and electrical engineering industry in the Seventh Five-Year Plan will be implemented only by mobilizing the creative forces and resources of the collectives of plants, scientific research institutes, and development and application bases. The task is for our achievements to become the factual confirmation of the decisions of the 11th BCP Congress and of the instructions issued by Comrade Todor Zhivkov on the dynamic and effective development of electronics and electrical engineering in the Seventh Five-Year Plan and through 1990.

5003
CSO: 2202

ADOPTION OF HIGHER STANDARDS OF WELDING URGED

Budapest MUSZAKI ELET in Hungarian 8 Oct 76 p 3

[Unattributed article: "Increasing the Quality of Welding"]

[Text] Experts of research and development in the field of welding nowadays talk about a new generation of welding approach, which emphasized during the last ten years the problems which emerged in the industry. A large number of new methods, which were used with success abroad, were tried or adapted to our conditions. But, as we find out from our discussion with Imre Kollar, head of the Welding Section of the Scientific Institute of the Machine Industry (GTI), the technical and economic benefits inherent in the modern methods are not yet known everywhere. Let us review some of the achievements of the so-called second generation:

A problem resulted over a long time from the fact that we did not know what types of steel should be used for welded structures intended for specially severe service. The main hazard to be eliminated was that of brittle fracture. This was unfortunately brought home to us through a number of regrettable accidents. For this reason, a ranking has been made at the Research Institute of the Ferrous Metallurgical Industry first of the various steels available to us and then also of the various welding materials. After a review of the findings, a method was developed and promulgated in MSZ [Hungarian Standard] 6280. By using the information in this standard, everybody can now select the proper base material, the welding material, and usually also the welding method, which will also reduce the hazard of brittle fracture. Subsequently, studies carried out at the VASKUT [Research Institute of the Ferrous Metallurgical Industry] also elucidated the welding behavior of microalloyed steels; these achievements have also been hailed by the international scientific community.

In addition to safety, the manufacture of welded structures must also ensure high productivity and a high level of manufacturing proficiency. GTI contributes to the meeting of this goal by adopting new technologies and by introducing them in the country.

Ganz Electrical Works purchased a French licence for the manufacture of large-size generators. According to the documentation obtained, electric slag welding is to be used to join 80-120 mm thick plates of steel, weighing 3-5 tons. This has been accomplished by using a method introduced by GTI in 1968 for both longitudinal and circular seams. The difficult nature of the job is illustrated by the fact that the preparation of the circular seem takes 10 hours during which the welding procedure cannot stop even for a second. Slag welding has also been used at the Hungarian Ship and Crane Factory for the mantle of the starting boiler of the Paks nuclear power plant, and at the Comminuting Equipment Factory in Jaszbereny for the posts of the Pilger mill made of cast steel. Spurred by the VBKM [Electrical Equipment and Appliance Factory], the GTI will now purchase a Soviet licence for the adaptation of the method to non-ferrous metals. This method may be used, for example, to weld 160 mm thick aluminum panels in such a manner that ribbon electrode and special welding powder is placed between the vertical parts, and performing the melting at a current of approximately 10,000 amperes.

The one-side method has been developed at the GTI to replace the two-side welding of structural panels used earlier. The panels are stabilized on a magnetic table and then are melted by overhead-arc welding in an automatic manner at a current of approximately 1,000 amperes. A special base system wss developed to prevent the penetration of the melt. As a result, it is no longer necessary to chamfer the large panels (down to 10 mm) or to fabricate the closing side specially. The turning-over — a hazardous operation — is eliminated and, last but not least, the productivity increased three- to four-fold.

Production of machine parts and finished equipment required the new methods for a long time. It is high time that we have highly productive, reliable methods, which ensure high quality and good appearance, to replace the manual arc and flame welding methods. We managed to introduce in a few places the microplasma welding method (with some adaptation and modification). This method is well-nigh indispensible in precision mechanics, instrument manufacture, and large-scale production of finished goods. We are engaged in the intensive study of the introduction of resistance welding and friction welding. The GTI succeeded in developing for the Hand-Tool Factory the method for the automatic welding of automobile wheel wrenches. The product is

pleasing in appearance and enjoys good acceptance on the export markets. The GTI has developed an entire machine line for capacitor-type resistance welding machines. The main advantage of these machines is that they provide uniform seam quality irrespective of fluctuations in line voltage.

The electron-beam method is practically indispensible in the welding of parts. This method is intensively developed at the Research Institute of the Communications-Engineering Industry. High-power electron beams are aimed at the workpieces placed in a vacuum. The resulting welded seams are narrow and deeply melted. This method is particularly useful in the manufacture of precision machine parts such as group gears in transmissions and microshuttles in high-performance looms. No deformation occurs in the process. The HIKI [Research Institute for the Communications-Engineering Industry] tries to introduce this method elsewhere also, and it also explores the idea of acquiring Soviet licence and manufacture the equipment domestically for our own use and for friendly countries.

The experts joined within the GTE believe that the wide utilization of the modern methods of welding requires some decisions urgently. This is why they desire to promote the domestic manufacture of the required equipment, mainly by the expansion of already available manufacturing capacities.

2542
CSO: 2502

PHARMACEUTICAL PROPERTIES OF APICULTURAL PRODUCTS BEING EXPLORED

Bucharest AGRICULTURA SOCIALISTA in Romanian 11 Sep 76 pp 4-5

[Interview with Eng Eugen Marza, director of the Apiculture Research Institute, by Maria Preda]

[Question] Last week, Bucharest played host to the International Apitherapy Symposium, whose topic was "Apicultural Products and their Technology." Could you tell us what was the goal of this meeting?

[Answer] During the last 10-15 years, apitherapy -- the use of apicultural products in the service of human health -- has elicited great interest among specialists, practitioners, and the general population. The recent symposium was intended to contribute to the inventorying and unification of the wealth of data and facts acumulated in research and practice, thereby contributing to the scientific fundamentation and development of this new branch of modern medicine. At the same time, one of the essential goals was to scientifically demonstrate the importance of using apicultural products in foods, particularly for children, young people, and the aged, as well as in human and veterinary medicine.

[Question] What can you tell us about the conclusions which were reached?

[Answer] Conducted in the spirit of high responsibility which has characterized the reunions of the apicultural world, and joining under the chairmanship of Prof V. Harnaj delegates and guests from more than 20 countries -- apicultivators, researchers, medical, teaching, and university personnel, and internationally renowned specialists -- the symposium heard some very fruitful discussions of a high scientific level. More than 70 papers on various aspects of apitherapy were presented, indicating that apicultural products used independently or in conjunction with other pharmaceutical substances are extremely effective in fighting certain afflictions. Particular attention was devoted to the investigation of the medical and pharmaceutical properties of propolis, bee venom, and polen, considered for a long time as "secondary products," given their many effects and effectiveness in the treatment of afflictions. Starting

with the observation that apitherapeutical practice has been ahead of research in this field, it was agreed that efforts should continue to be expended to develop a rigorous scientific basis in this domain, and that specialized actions should be taken to integrate apitherapy with scientific research.

[Question] What has been the contribution of our specialists?

[Answer] Although apiculture in Romania has an ancient tradition -- last year we celebrated the centenary of the first associations of apiculturists -- its intensive development has occurred especially in recent years, when due to the support received from the party and state, it was possible to create the Apicultural Combine, equiped with production departments, shops, and laboratories; the Apicultural Research Institute; and the Apicultural High School, with a strong center for training and specializing apicultural personnel. In this respect, the integration of education-research-production has become a reality, providing a basis for the development and modernization of apiculture.

Notable results have been obtained in perfecting intensive industrial techniques which have led to a one hundred percent increase in productivity. By correlating research and development activities with production ones, it was possible to prepare medical products for combating diseases and pests, and to lay the scientific basis of apitherapy, assuring the controlled use of active elements in apicultural products. The existence in Romania, of the Apimondia International Institute for Apicultural Technology and Economy, has made it possible to establish a medical department with specialized sections for internal diseases, rheumatology, neurology, cardiology, surgery, urology, dermatology, ORL, stomatology, and so on. These "apisections" are endowed with medical analysis laboratories, pharmaceutical desks, medical instruments, and experimental laboratories for product preparation, and are intended to synthesize and put into practice the results of research. The contribution of our specialists in this respect is remarkable. In fact, many papers were presented at the symposium, referring to the results obtained from the administration of various apicultural products to prevent and combat diseases of the blood, viroses, hepatitis, alergies, pre and post operative treatments, ophtalmology, ORL, skin burns, wounds, mycotic stomatites, and so on.

[Question] Another important event organized by the Apicultural Combine is the Third International Apicultural Exposition and Fair. What is the topic of this event?

[Answer] During the Exposition, participants from all corners of the country and from abroad will present products, materials, and tools for processing and treating apicultural products, books, and other teaching materials. Of course, a large amount of space will be taken by energizing, vitalizing, dietetic, pharmaceutical, and cosmetic apicultural products and their derivatives. Of equal interest will be the stands which will present the history of Romanian apiculture and which will form the nucleus of the future apicultural museum.

In closing, I want to point out that these two events have provided new occasions for showing the world the progress of our apiculture, in strengthening the collaboration between our specialists and practitioners and those from abroad, and in developing this beautiful art placed at the service of mankind's health.

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CSO: 2702

RECENT PROGRESS IN GEOLOGIC RESEARCH

Bucharest ERA SOCIALISTA in Romanian No 15, Aug 76 pp 3-7

/Article by Prof Bujor Almasan, minister of mines, petroleum and geology: "A New Advance in Our Geologic Research"/

/Text/ The party administration, which constantly emphasizes geologic research, analyzed the progress of this activity in the middle of this June at a working session of the Party Central Committee chaired by Nicolae Ceausescu. On this occasion Romanian geology received new data and useful directives to enhance its contribution to the development of our domestic reserve of mineral raw materials and energy resources.

Administrative personnel from the State Planning Committee, the National Council for Science and Technology and other central state organs, as well as administrative personnel and specialists from the Ministry of Mines, Petroleum and Geology, the National Commission for Geologic Reserves, the subject research institutes and the enterprises for geologic prospecting and exploration, all contributed to this analysis, which was a landmark in our geologic activity and opened up a broad field for intensive and creative efforts to increase our national reserves of mineral resources. I shall try to outline below some of the measures to be taken in pursuance of the directives handed down on this occasion, after which I shall briefly summarize the state of geologic research in Romania and its tasks in future years.

The importance of mineral resources to the progress of civilization is well known. All the machines and tools used by man incorporate materials or mineral raw materials, just as all machines use various forms of energy that is still to a great extent derived from fossil fuels.

Throughout history the mineral materials lent names to ancient civilizations (the bronze and iron ages) and then constantly gained ground for over 2,000 years, dominating the 19th century in the form of coal and our century in the form of petroleum, and the next century will undoubtedly be characterized by uranium or hydrogen. Under the impact of the growing demands of a modern economy, the threat of exhaustion of resources, and the deterioration of the international economic mechanisms, which has impaired economic cooperation among

states, the procurement of raw materials and fuels continues to be one of the vital problems of the modern world and the states' economic policy, alongside the demographic explosion, alimentation, environmental protection, or the elimination of underdevelopment in most countries of the world.

It goes without saying that the problem of mineral resources is also becoming increasingly important to Romania, embarked as it is on the course of an intensive industrial development.

As we know, Romania has a complex geologic structure composed of ancient formations and a highly variegated petrographic composition that have encountered conditions in the course of the ages that favored the accumulation of a wide range of useful mineral substances. Thanks to this mineral heritage, Romania has been extracting iron, copper, gold and salt from the most ancient times and has been an envied world pioneer in the extraction and processing of crude oil.

Although the effort to determine these resources has received quite inadequate material support in the past, it has nevertheless benefited by the invaluable activity of a galaxy of geologists who constitute a true Romanian school of geology and who have won merited esteem at home and abroad. They have partially compensated for the lack of material support by their professional enthusiasm and painstaking scientific work. That is why we have an idea of our national mineral resources in our approach to socialist construction and industrialization in Romania, although we do not have an adequate knowledge of them.

To protect socialist industrialization as far as possible from dependence upon foreign raw materials, the RCP has based industrialization upon the principle of the greatest possible supply of the national economy out of domestic resources. Accordingly the development of the extractive industry and consequently of geologic research have become an integral part of the policy of industrialization and expansion of the domestic base of mineral raw materials and a permanent aim of the economic policy of our party and government.

In the course of the last decade, and especially in 1971-1975, this basic aim of our economic policy has been increasingly emphasized as a far-seeing and long-range consideration, taking the form of a true extractive industrial policy.

In the field of energy resources, the policy of developing a broadly diversified energy base was consistently promoted, requiring increased production of all bearers of primary energy in proportion to Romania's reserve potential. This explains the fact, surprising to some, that we have been among the precursors of a continuous and rapid development of coal production during a period in which many industrialized countries deliberately limited their coal extraction and closed down hundreds of mines. This explains why our party and government designed and implemented a policy of conservation of our deposits of crude oil and rational use of the latter and natural gases during a period when the world was exploiting petroleum extravagantly and the industrialized countries were hastily converting practically all their industrial economies to the consumption of hydrocarbons.

In the field of metallic and nonmetallic mineral raw materials, a policy of maximum development of domestic production within the limits of the reserve potential was implemented with the same consistency and at even more rapid rates. The correctness of this political conception has been fully confirmed by the progress of the Romanian economy, which could not have met the constantly growing requirement for raw materials in any other way, and also by the world situation resulting from the crisis in energy and raw materials.

Of course the development of our extractive industry required huge material, organizational and research efforts to systematically determine and inventory the resources of our subsoil. And in this area too our party and government took a firm stand, allocating more and more resources to broad and intensive geologic research to an extent unprecedented in other countries. The allocations for geologic investigation amounted to 6-10 percent of the total investments in industry and rapidly increased from one five-year plan to the next (by about 5 times in 1971-1975 compared with 1951-1955).

This extensive effort not only increased the industrial output throughout the entire period but also resulted in great gains in the reserves. For example, as of 1 January 1976 our reserves of natural gases and iron ores were about 6 times greater than they were in 1950, those of coal were about 22 times greater, those of nonferrous ores were nearly 49 times greater, etc.

In view of the constantly growing requirements for mineral raw materials and fuels and the increasing difficulty of importing them, as well as the present and future reserve potential, the 11th Party Congress assigned the extractive industry the over-all task of further expanding the base of raw materials and energy resources by intensified efforts to determine and exploit all of Romania's natural resources. Romanian geology, which is expected to increase the industrial reserves of the nation's minerals, often under conditions more difficult than in the past, has a particularly important part to play in this assignment.

The Uniform National Plan for the Socioeconomic Development of Romania in 1976-1980 provides major increases in the reserves of all useful minerals, and the new reserves are to be greater than the quantities that will be extracted. This will provide production with more natural resources and will permit new production increases in the periods after 1980.

The general studies and surveys (to which the specialized organs in the research and planning units and the prospecting and exploring units of the extractive industry as well as the departments in higher education and highly qualified specialists from the Academy of the Socialist Republic of Romania and the National Council for Science and Technology all contributed) determined the necessary measures to implement the plan for increasing the reserves. They were included in three research programs to develop the hydrocarbon reserves and in geologic research programs concerning solid substances according to structural and geographic units. These programs guide geologic projects and schedule them in time. They are intended to reveal new mineralized areas, to promote the reserves in the higher categories, to prepare for the exploitation of new deposits, and to determine the directions of geologic research in the 1981-1985 period.

Other special programs, in pursuance of Nicolae Ceausescu's directives, are to intensify geologic research to discover new reserves of coking coal, and to investigate resources of solid minerals.

Although the adopted measures meet the assignments for developing the reserves, we cannot say that we are satisfied with the pace of geologic research, since the needs of the national economy for some important substances cannot be covered, the supply from foreign markets has become increasingly difficult, there are still some defects in geologic operations, and the latter are still facing difficulties that have not yet been resolved. We must seek new ways of mobilizing and exploiting our mineral resources.

The defects and difficulties in our work were strikingly revealed by the party secretary general's analysis, and they mainly have to do with the still unduly long duration of geologic research on some objectives and in determining the technologies for exploiting some mineral resources. The efforts are dispersed over too many objectives, some of limited importance, and the collaboration of of the interested elements to clarify the state of the new deposits, especially from the technological standpoint, is inadequate. In the case of some important substances such as crude oil, iron ores and others, the geologic research findings are not in keeping with the state's material outlays. The introduction of new technical elements is slow and on a small scale, and outfitting with modern working means still leaves something to be desired, especially in the case of depth and computing equipment. Organization of activity in the geologic units in the field, of geologic operations in general, and of geologic personnel training can and must be improved, and there are not yet enough geologists and other specialists in the field units.

In addition to the foregoing, it must be said that some geologists (although few in number) have unfortunately conceived the idea that the Romanian subsoil has been completely investigated for some substances such as crude oil and that there are no more deposits to be discovered. This unprogressive attitude limits the horizons of geologic research and, what is most important, it is refuted by a number of recent geologic findings such as the discovery of crude oil deposits localized in complex traps and deposits at great depths, and also by the favorable development of the reserves and extraction ever since nationalization. Moreover such ideas have also existed in the past and are outmoded, expressing a routine spirit that hampers progress in research by conveying the impression that the limit of knowledge has been reached. They must be changed by scientific training and regular political indoctrination to encourage the creative spirit and foster in all workers an advanced attitude toward progress in the geologic sciences and in prospecting and exploring the nation's subsoil.

The teachers who train specialists in geology have an important part to play in the effort to change these ideas, and the training itself needs to be greatly improved by strengthening basic training in the natural sciences and in physics and mathematics, and by broadening the professional background of the geologist to include a comprehensive education and more extensive engineering disciplines. Further emphasis is also needed on training specialists in the geology of hydrocarbon and ore deposits and in that of seas and oceans. Geophysical engineers

must be trained not only to apply modern research methods but also to develop them and even to plan and design the needed geophysical equipment.

A question requiring close attention is that of intensified integration of education, research and production through in-depth study of the existing methods and investigation of other methods of integration. The teachers at the Bucharest Faculty of Geology and the geology sections at Cluj-Napoca and Iasi are requested to cooperate more closely with the geologic institutes and enterprises and to collaborate on the joint solution of research problems. It is desirable and very useful for the students in these educational units to participate during their education in the practical work of the geologic units and to cooperate with their teachers in the solution of problems of current practical interest. It is important to emphasize the students' experience in the final years and the choice of subjects for their dissertations, to be written under the supervision of both the teachers and the specialists in units. All this will lead to a sound knowledge of the modern equipment and working methods.

To secure a reserve of personnel adequate for the tasks, emphasis must be placed upon selection of the geologic specialists from the stage of training in higher education and on into the subject units. The requirement for geologists should also be reconsidered and the number of positions in the geologic fac lties and sections should be correspondingly increased. Since the conception of deposits is constantly changing, the teachers training specialists in geology must keep up with these changes and be closer to production and its specific conditions and accordingly adjust their courses to the new facts.

The directives handed down at the working session are basic to some specific programs being developed by the collectives of specialists formed for this purpose. We shall outline some of the problems considered by these collectives.

If geologic activity is to cope with the great tasks confronting it, it must begin by making use of recent progress in basic geologic research, in the determination of Romania's geologic structure, and in the methods of extracting and especially processing the low-grade mineral substances. In the first place this will effectively encourage research in geology and related disciplines (geophysics, geochemistry etc.) to broaden its efforts to know the subsoil, to form a new view of the prospects of discovering new deposits, and to direct its future prospecting and explorations in general.

Collaboration between geology and other allied disciplines, such as physics, chemistry, physical chemistry, mathematics, biology et al., must be considerably improved. For instance, physics is expected to play a more active part in the theoretical substantiation of structural geology (microstructural analysis of rocks and ores, study of the major structures of the earth's crust), which will improve our knowledge of the geometry of the geologic structures and the conditions of deposition of the various accumulations of liquid and solid mineral substances. The introduction of modern methods like plasma spectrometry, fluorescence of X-rays in a vacuum, emission quantometry, and the methods of nuclear fission by use of the Moessbauer effect, as well as the expansion of analytical methods by activation with neutrons, can mean new progress in geologic hypotheses and determining areas with prospects of mineral resources.

Chemistry and physical chemistry can make a useful contribution to the explanation of the conditions of rock and ore formation and to laboratory synthesis of minerals by the techniques of very high temperatures and pressures, approximating natural conditions. Alongside the traditional methods of chemical analysis, it is planned to introduce highly sensitive radiochemical methods that will permit analysis of microquantities for a more precise description of the indicative ores and minerals. This will provide data for new geologic working hypotheses for purposes of guiding prospecting and determining the physical-chemical conditions at the great depths that will be worked in the future.

A growing role in geologic research is being played by mathematics and its contribution to the solution of problems requiring processing of a large number of data, such as determination of the laws of distribution of mineralizations, delimitation of concentrations of economically useful minerals, evaluation of the economic potential for the main resources, and study of the mathematical models of geologic processes. Solution of these problems will permit a better substantiation of the planning of mining capacities, especially the big open pits. Electronic computing in geology and geophysics will be considerably more expanded than before, for more rapid and accurate determination of the geologic conditions of the deposits. Similarly we can begin implementing information systems (forming geologic data banks and libraries of algorithms and programs) and a modern geologic information science.

And finally, biology in geologic research (along with paleontology and palinology) will be increasingly required to study the possibilities of exploiting ores with a very low content of metal (copper, manganese etc.) which cannot be profitably processed by the traditional methods but by use of species of bacteria, as well as other studies.

As for ways of improving prospecting and exploration, first comes intensified geologic operations in all areas, with a priority on the substances for which the requirements of the national economy are not completely met by domestic resources (hydrocarbons, metal ores, coking coals, and some nonmetallic substances). We could exploit a number of our existing resources by new efforts in the geologic sector and in technological research, provided that we concentrate our forces on the objectives of major interest, with a high potential for reserves and the most immediate prospects of exploitation. Comprehensive studies should be made of these objectives to guide geologic investigations. The closest possible integration of geological and geophysical research methods must also be studied.

The problems of the geologic objectives of major interest are to be approached through a comprehensive study, with geologic, geophysical and geochemical methods accompanied by drillings or mining operations, on the part of mixed groups of specialists in all these disciplines and in the field of exploitation, namely exploitation and preparation engineers and technologists in the processing branches. This will completely clarify the state of the deposits, from geologic prospecting to the final exploiting solution and provision for the entire planning of the industrial capacity. If necessary this group can pursue its

activity to the point of microproduction. We shall also have to consider setting a time limit for finishing the comprehensive study according to the stages of prospecting, preliminary exploration, detailed exploration, extraction methods, exploitation methods, planning, construction and even activation. Our specialists are qualified for a more regular effort to find ways of rationalizing the methods of investigating the subsoil, as an important way of expediting the operations and lowering their costs.

The measures taken in the last few years have created an adequate organizational framework for geologic research, but some improvements are needed in the organization and operation of the prospecting and exploring units in the field by way of supplementing them with various specialists, with equipment for mineralogical and petrographic studies, and with laboratories for physical-chemical analysis. These enterprises must cooperate more closely with the research institutes organized in the mining regions for joint solution of the problems, and the Institute of Geology and Geophysics must lend technical aid to introduce new methods of investigation. We shall take steps to relieve the geologic enterprises in the field of some tasks for opening mines in the mine regions now in operation, so that their entire capacities will be used for geologic avtivity. There is also urgent need of a computing center specializing in geologic and geophysical problems and with a high data processing capacity, since the present inventory of the computing units serving geology is causing great delays (even of whole years) in processing the huge volume of data supplied by geophysical research in particular.

Intensified geologic research directly depends upon raising the technical standard by two basically important actions, namely introducing new technologies that will clarify the objectives in easier, faster and cheaper ways, and improving the technical inventories of the research units, both serving to expedite the operations. We have problems to solve in connection with the current supply of equipment or devices of types now in operation. For instance we must cover the whole requirement for winches for drilling with borers, and the requirement for bits (especially with diamonds), core drills etc. for drilling with sounds. The rapid and efficient performance of mining operations requires mechanized equipment for digging the galleries and shafts, often of types smaller than those used in the mining operations of the production units. One problem that is very urgent is the domestic manufacture of the tractor-mounted drilling installation, for greater mobility in directing the means for investigating objectives in areas more difficult of access.

For the greater effectiveness of geologic research from the standpoints of duration, research costs and certainty in determination, we must much further expand geophysical methods, physical-chemical techniques for investigating rocks and, in general, the highly diverse investigating methods, some of which are now being perfected in the laboratory and are to be introduced in field work. The geophysical methods can also be used more extensively in underground investigations. Another major problem is expediting the domestic manufacture of geophysical instruments and devices within the specialized institute, where production will be developed for this purpose. Similarly collaboration with the National Council for Science and Technology, the State Committee on Nuclear Energy, and

the specialized units in the fields of electronics and precision machinery should also be greatly intensified. The field of application of the geochemical prospecting method must be far extended, and the new, highly productive equipment of this method must be introduced.

As we see, the accelerated pace of geologic operations is taking highly varied forms, from predominantly quantitative (additional equipment and manpower) to organizational ones, including those of a strictly qualitative nature such as more and more methods of investigation and highly sensitive and accurate equipment. This major orientation of efforts applies to practically all geologic research, in the research operations in the areas under exploitation and their expansion, in the new areas in all stages of investigation beginning with mapping, prospecting and exploring, and in the research methods as a whole. Hence the intensification of geologic research will take the forms of additional research programs, introduction of new methods and techniques, material supply, and measures for better organized activity.

Another important aim is expansion of the scope and subject matter of geologic research in several directions, such as opening up areas as yet uninvestigated, extending the concept of the "industrial reserve" to include low-grade deposits of no economic interest in the past, and including new and previously useless mineral substances in the concept of the "reserve" and economically exploiting them.

As for expansion in space, we must immediately implement the approved program for investigating the deeper areas in the earth's crust, beneath the level of the present operations, where the geologic prospects for hydrocarbons are promising. Our specialists are expected to considerably increase their efforts to determine the maritime area, so that Romania can participate in the exploration and exploitation of the mineral resources of the World Ocean. In the next 2 years the specialized units in the extractive industry must finish these preparations and provide for a specialized research ship, outfitted with suitable scientific equipment, and form the potential of specialized personnel. The problem also arises of extending regular research to all regions of the nation, since all the geologic formations may contain accumulations of useful minerals in varying degrees.

It is well known today that under the impetus of the growing demand there is a worldwide trend toward economic exploitation of deposits with more difficult working conditions (greater depths, more pronounced dispersions, strata with thinner seams, increasing temperatures and pressures, greater emanations of toxic gases, water discharges), located in less accessible areas (in polar regions, marine platforms, or sea and ocean waters), or with contents poorer in useful elements and difficult to prepare. Accordingly what was unexploitable yesterday is becoming exploitable today, and this is considerably increasing the volume of reserves that can be industrially processed. As we say, while the useful contents decrease in an arithmetical proportion the exploitable reserves increase in a geometrical proportion. This policy was also clearly indicated by the 11th Party Congress, especially for the nonferrous and iron ores. A more sustained effort is needed to finish geologic research as soon as possible on

several objectives proven promising by the work already done. The opening in this five-year plan of the low-grade deposits at Moldova Noua, Rosia Poieni et al. naturally results in a lower metal content in the extracted nonferrous ores, but due to the new units' high productive capacities and the fact that the operations are on the surface and performed with equipment up to world standards, the outlays for extracting and preparing the metals will approximate the average ones in the units under exploitation.

Greater efforts are required to exploit new sbstances hitherto unexploited in Romania, with which world experience is sometimes limited too. It is a question of expanding research in number of areas to clarify new objectives of bituminous shales, serpentines with nickel and chromium, heavy minerals with rare and dispersed metals, clays for aluminum etc. In connection with these new substances or the low-grade deposits, it is absolutely necessary to improve the technological research on many deposits. Since the technologies for exploiting these substances require close collaboration between the mining and processing sectors, all studies leading to the final solution of the problem must be better coordinated.

In connection with the foregoing I shall discuss only one of the new sources, namely the thermal waters. In the Crisul Repede-Valea Ierului area alone, in Bihor County, reserves have already been found with an energy equivalent of almost 1 million tons of conventional fuel, discharges of 1,000 cubic meters a minute or even more, and temperatures of 40-95° C. But the exploiting operations are slow despite the interest taken in them by the local county organs. The areas of thermal waters extend throughout the western plain, and there are very promising indications both on the Cimpia Romana and in the Subcarpathian zones.

The approach from new viewpoints to already investigated areas the extent and depth of which are known is an important research aim. These viewpoints result from the recent progress of the geological sciences, that is they are based upon other theoretical grounds, other principles provided by basic research. To be sure there will be new problems, especially the search for deposits that we have no indication of today. In a first stage, there will be great demands upon basic research and therefore it will have to play a leading part in the activity of the research institutes and units. The specialists will have to be directed to take up these problems, the solution of which can lead to the rapid growth of our nation's reserves.

We are fully convinced that the party secretary general's valuable directives will have a profound effect upon the geologic workers because as they carry them out, new paths will be opened to Romanian geology, even in 1976, for the assertion of the innovating spirit, dedication and patriotism that has characterized our geologists in the years of socialist construction. The results will take the form of considerable above-plan gains in reserves and the exploitation of many new deposits not envisaged in the preparation of the five-year plan. The conference with geologic personnel, planned for the fall of this year, will be the first occasion for an in-depth analysis of our progress in the fulfillment of the new tasks.

- END -

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